Installation and Commissioning Plans

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CMS week,

CERN December 7th 2004

BMU Installation Update

- From October 20th to 29th we installed 7 MB1 in sectors:
  8, 9, 10, 11, 5, 2, 4

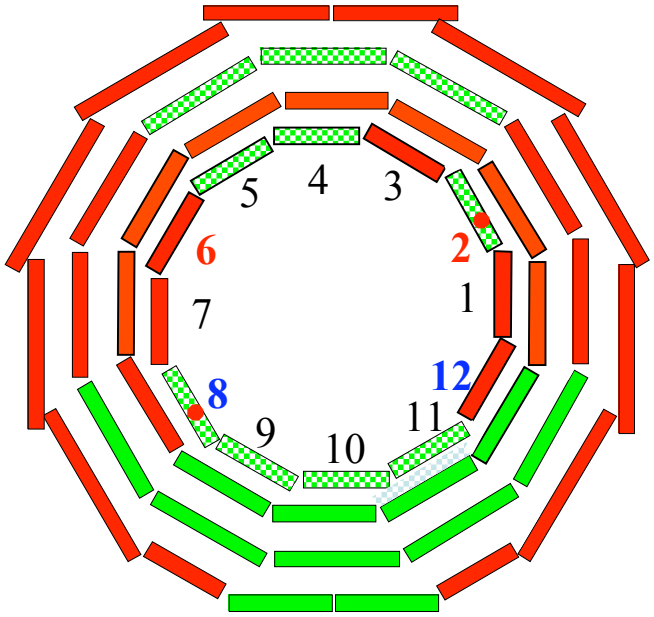
And 3 MB3 in sectors:
5,4 and 3

For a total of 10 Chambers
7MB1 and 3MB3

- 2 MB1 in sectors 8 and 2 are equipped with minicrates

- Installation of MB2 in Sector 8 was postponed due to a gas leak in one RPC

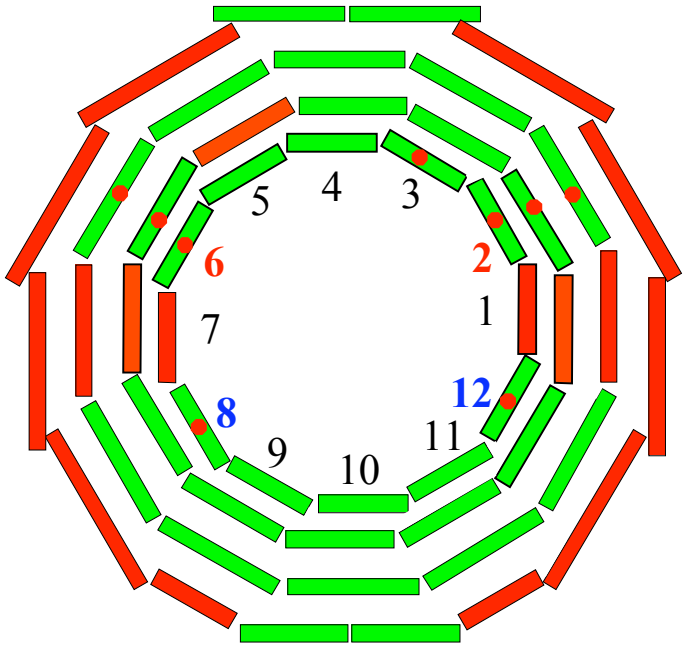
YB+2

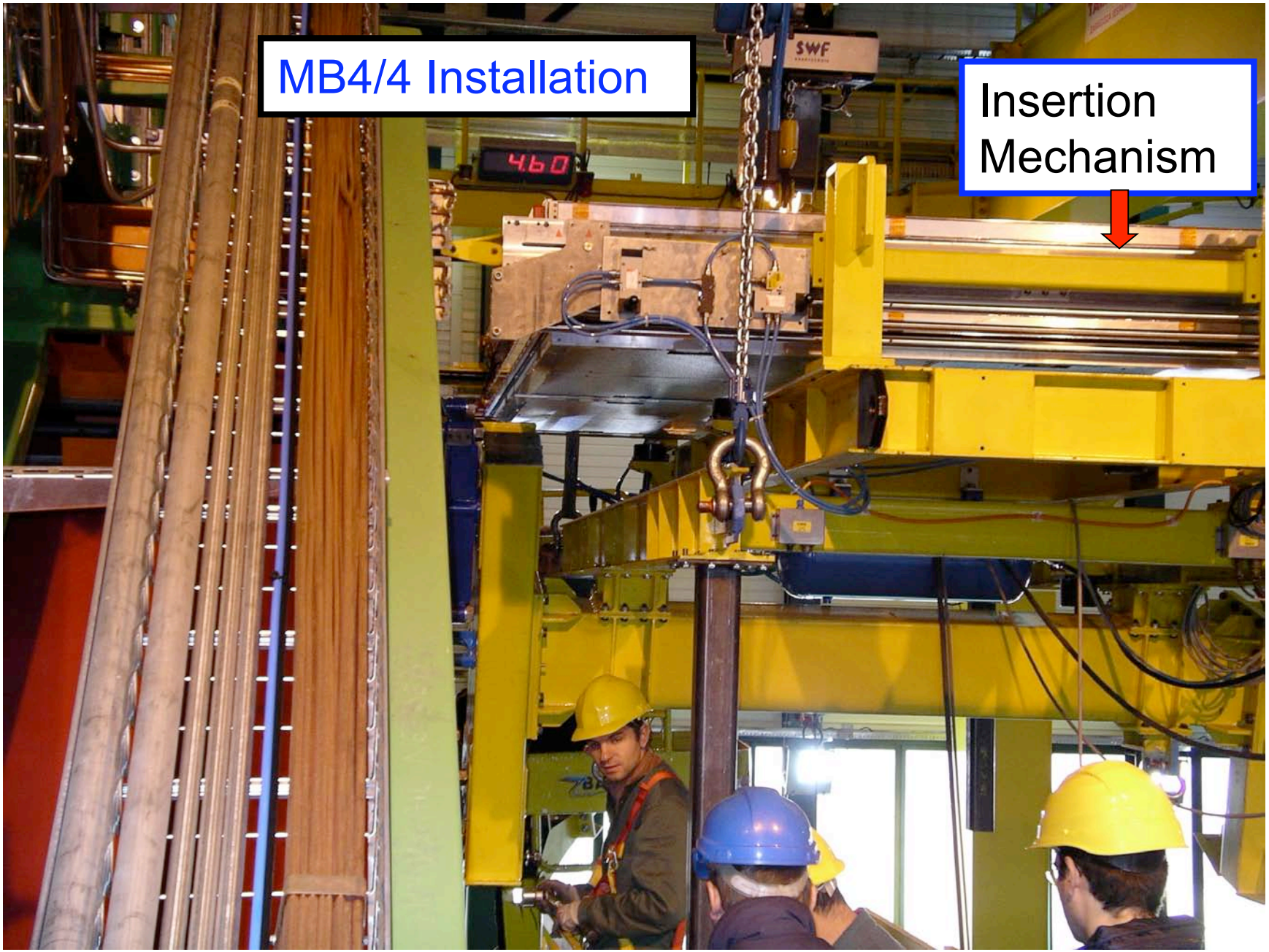


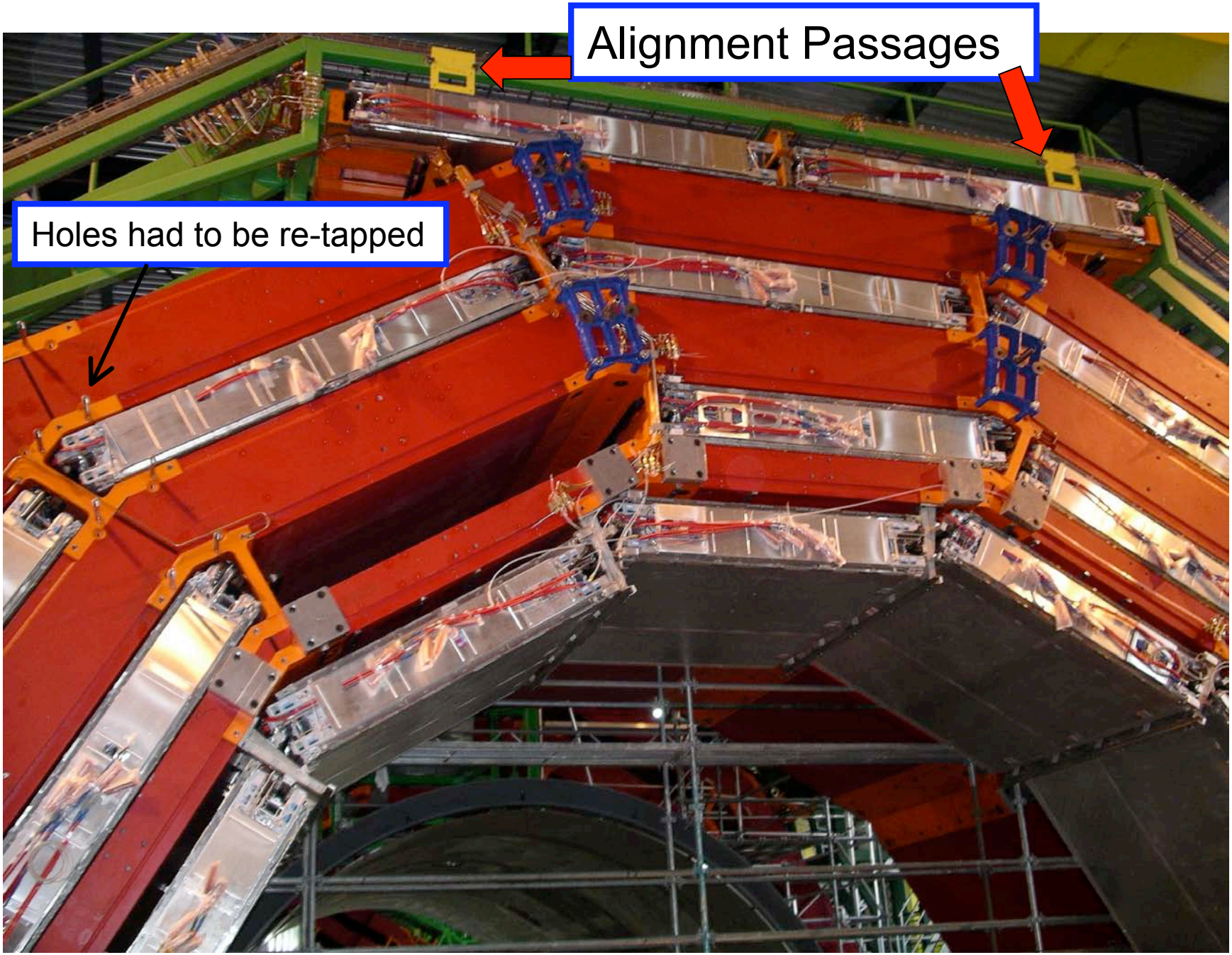
BMU Installation Update

- From November 25th to December 3rd we have installed 12 chambers:
  3MB1, 5MB2, 2MB3, 2MB4/4
- One of the RPCs for MB2 Sector 5 has to be rebuilt. This chamber will be installed next year (February March)
- 5MB1, 2MB2 and 2MB3 were installed with Minicrates (indicated with red dots)
- The MC were checked with the boundary scan program at SX5 (M.Zanetti, R. Travaglini, J.P.Pelayo)

YB+2




MB4/4 Installation
Insertion Mechanism
SWF
460


Alignment Passages
Holes had to be re-tapped

BMU Installation Comments

- In the last installation period the logistic was greatly simplified by the third installation frame (decouples chamber preparation and transport)
- Between the two installation periods the cradle was modified to house the insertion tool designed by C. Burgos. The tool works very well and was used for most of the installation. There is an interference with a cradle support for some MB2s. It will be corrected for the next installation (minor modification).
- The natural installation sequence MB1, MB3, MB2 was altered to cope with MC and chamber availability. This resulted in additional cradle reconfigurations and time losses.

BMU Installation Comments

- The cradle supports are mounted on the Wheel with the crane. This blocks the chamber handling and thus slows down the installation. At present we have supports for 3 adjacent sectors. The installation could be streamlined by buying additional supports for 5 + 1 Sectors.
- Often we had problems while mounting the cradle supports due to bad threads in the iron. We should check all of them before the next installation.
- In the future we should install the Top part of the Wheel first. The bottom MB1s look pretty vulnerable from above.

BMU Installation Comments

- During the MB4/4 installation we found an interference with the alignment passage plates that had to be shifted up. To be checked with alignment people.
- Some of the jacks that will be used to open the wheels were mounted with the wrong orientation and block the MB4.4 installation. They will be rotated before next installation.
- Some HO and thermal screens were installed in the bottom part without problems.

DT for Installation in 2005

BMU installation is planned in 3 periods:

- YB+1 without MB4To => 36 chambers
- YB+0 No MB4To and YB+2 MB4To => 18 + 6 + 3 = 27
- MB4To in YB+1, YB+0 and S10,S11 in YB-1, YB-2 => 27

For a total of 90 chambers (83 without feet chambers) including 15 MB4 from Torino.

This leaves 87 chambers to install in SX5 after the magnet test and 40 in UX5.

Almost all chambers have been assigned for installation but the Chimney chambers MB3 and MB4/4 in YB+1 are still missing.

Chambers for Installation in YB+1 Top

	YB + 1				
Sectors	+2	+3	+4C	+5	+6
Services	Right(ZpA)	Left (ZpB)	Right (ZpA)	Left (ZpB)	Right(ZpA)
Chambers	MB1P11	MB1P37	MB1Pxx	MB1P19	MB1P38
Chambers	MB2P39	MB2P35	MB2Pxx	MB2P36	MB2P38
Chambers	MB3P46	MB3P42	MB3P00	MB3P26	MB3P40
Balance B	Left	Left	Right	Right	Right
Chambers			MB4 4Cxx / MB4 4Cxx		
Balance B			L / R		

- In green the chambers with HVB_F

Chambers for Installation in YB+1Bottom

	YB + 1				
Sectors	+8	+9	+10	+11	+12
Services	Right(ZpA)	Left (ZpB)	Right(ZpA)	Left (ZpB)	Right (ZpA)
Chambers	MB1P36	MB1P22	MB1P23	MB1P25	MB1P35
Chambers	MB2P25	MB2P20	MB2P40	MB2P18	MB2P21
Chambers	MB3P38	MB3P06	MB3P34	MB3P20	MB3P22
Balance B	Right	Right	Right	Left	Left
Chambers		MB4C32		MB4C33	
Balance B			R L		

Chambers for installation in YB0+ Top

	YB 0					
Sectors	+2	+3	-4		-5	+6
Services	Left(ZpB)	Right (ZpA)	Right(ZmA)		Left(ZmB)	Left(ZpB)
Chambers	MB1P08	MB1P12	MB1N05		MB1N39	MB1Pxx
Chambers	MB2P08	MB2P07	MB2N16		MB2N41	MB2P03
Chambers	MB3P00	MB3P28	MB3N25		MB3N23	MB3P00
Balance B	Left	Left	Right		Right	Right
Chambers			MB4-C02	MB4-C01		
Balance B			L	R		

Chambers for installation in YB0+ Bottom

	YB 0					
Sectors	-8	-9	+10		+11	-12
Services	Right(ZmA)	Left (ZmB)	Left (ZpB)		Right (ZpA)	Right(ZmA)
Chambers	MB1N24	MB1N04	MB1Pxx		MB1P21	MB1N26
Chambers	MB2N42	MB2N44	MB2P37		MB2P45	MB2N43
Chambers	MB3N17	MB3N21	MB3P44		MB3P48	MB3N27
Balance B	Right	Right	Right		Left	Left
Chambers		MB4C32	MB 4L3 2	MB4 R29	MB4C33	
Balance B			R	L		

Chambers for installation in YB-1 S10,S11

	YB - 1				
Sectors	-8	-9	-10	-11	-12
Services	Left (ZmB)	Right(ZmA)	Left (ZmB)	Right(ZmA)	Left(ZmB)
Chambers	MB1N27	MB1N	MB1N43	MB1N45	MB1N40
Chambers	MB2N	MB2N	MB2N15	MB2N28	MB2N
Chambers	MB3N09	MB3N11	MB3N33	MB3N31	MB3N19
Balance B	Right	Right	Right	Left	Left
Chambers		MB4Cx	MB4 L32 / MB4 R31	MB4Cx	
Balance B			R	L	

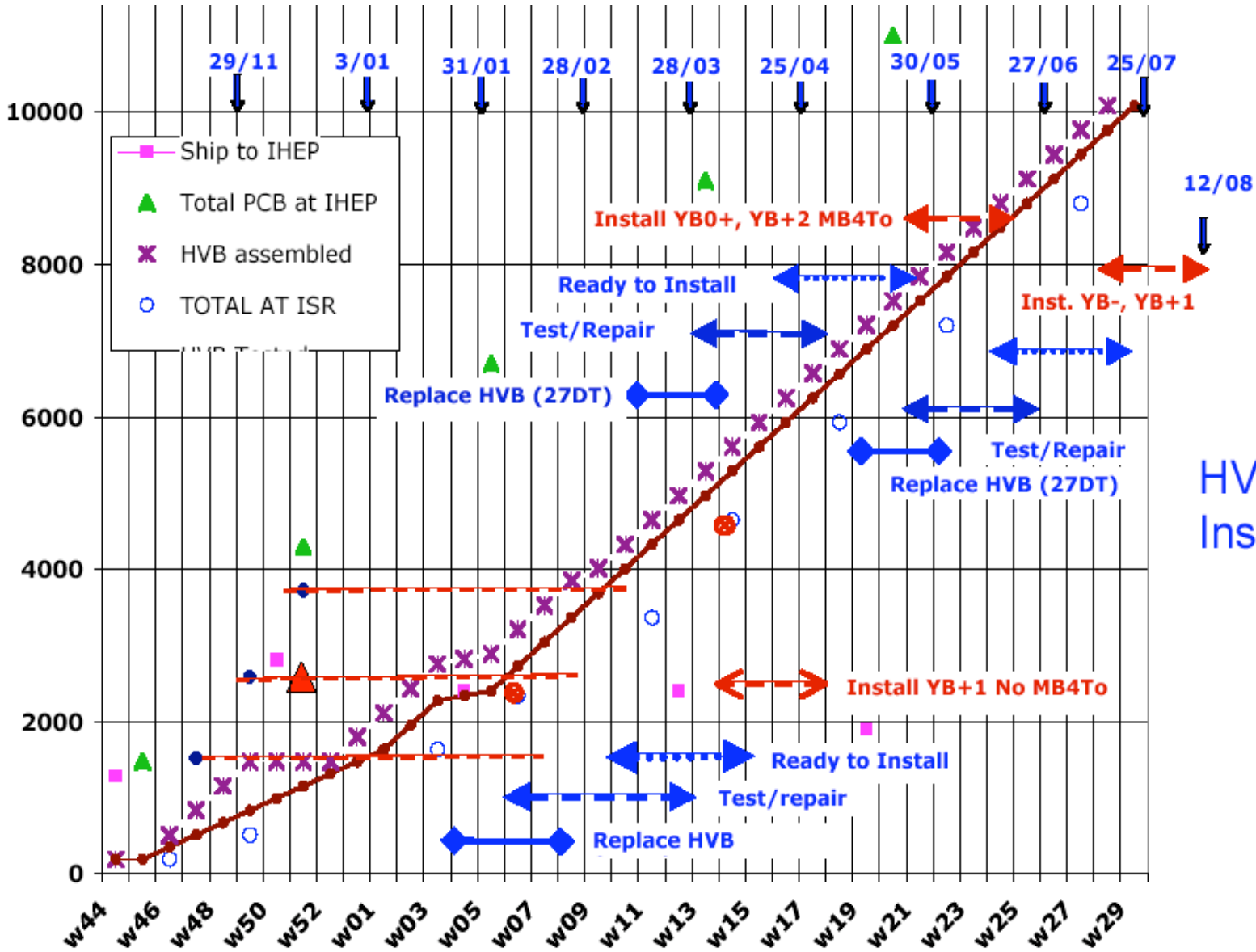
Chambers for installation in YB-2 S10,S11

	YB - 2					
Sectors	-8	-9	-10		-11	-12
Services	Right(ZmA)	Left(ZmB)	Right(ZmA)		Left(ZmB)	Right(ZmA)
Chambers	MB1N	MB1N	MB1N42		MB1N41	MB1N
Chambers	MB2N	MB2N	MB2N13		MB2N27	MB2N
Chambers	MB3N	MB3N	MB3Nx1		MB3N29	MB3N
Balance B	Right	Right	Right		Left	Left
Chambers		MB4C31	MB4 Lxx	MB4 Rxx	MB4Cx	
Balance B			R	L		

HVB Production Model

- HVB production = 320/week
- HVB testing = 160/week up to January 15th 2005
- HVB production = 0.2*Nominal for 2 weeks (holidays)
- PCB Shipments: 2468 + 345 HVB_8 (December in reality only 1444) 2400 end of January, 2400 Mid March, 1900 Mid May
- HVB shipments: 200 + 320 in 2004, 1120 Jan10, 704 Jan31 (to sites), 1024 Feb28, 1280 every 4 weeks afterwards

Given the delays in pcb shipments to IHEP, the crucial shipments on Jan31 and Feb28 are in jeopardy



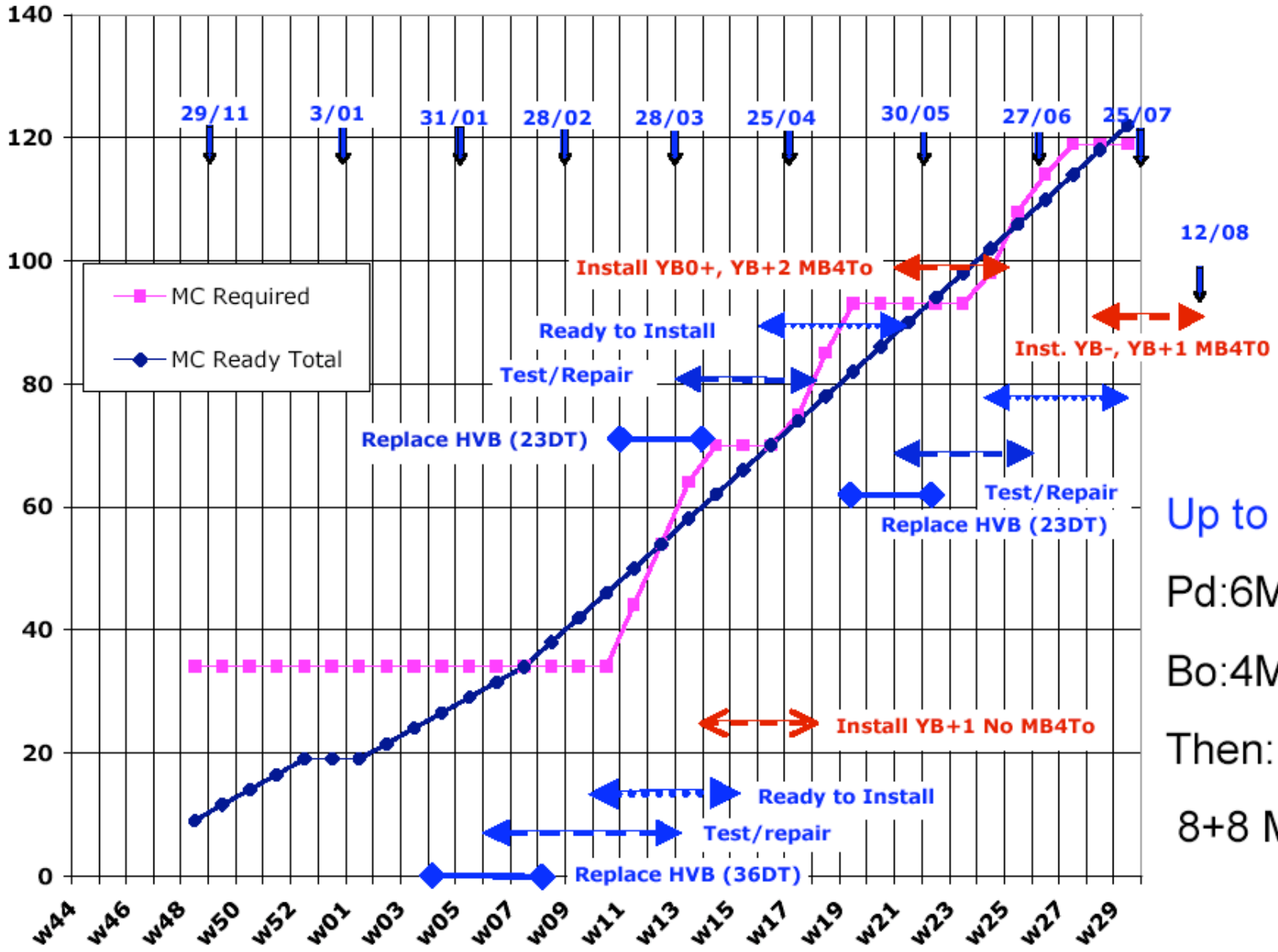
HVB driven Installation

YB+1 No MB4To = 36DT (1524 HVB)
YB0, YB+2MB4To=27DT (1066 HVB)
YB+1YB0+MB4,YB- = 27 DT (1134 HVB)

⊗ HVB shipment for Assembly Sites

Red dashed lines indicate the integrated HVB required for the 3 Installations(up to Magnet Test)

MC production vs Installation Schedule



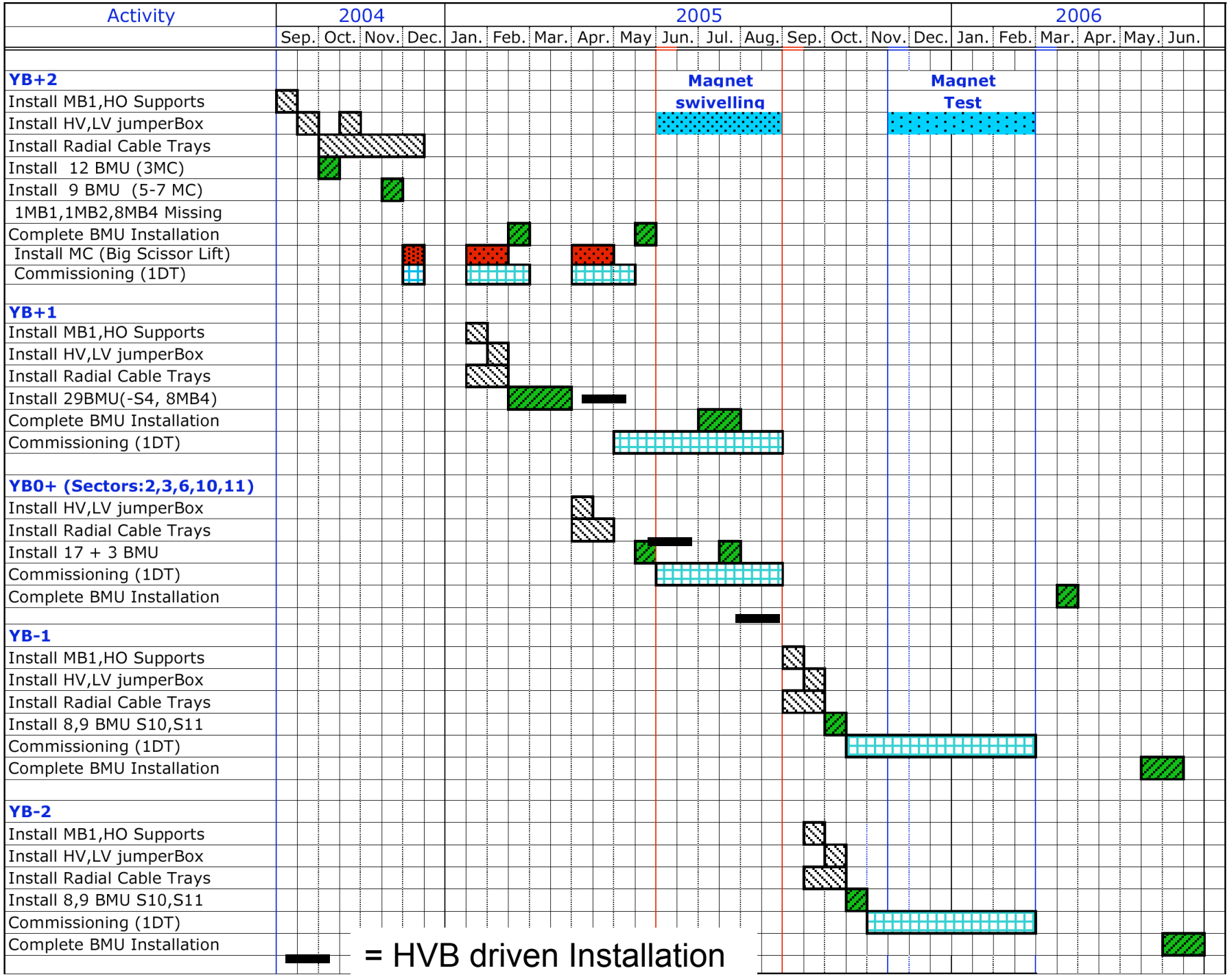
Up to 21/02/05

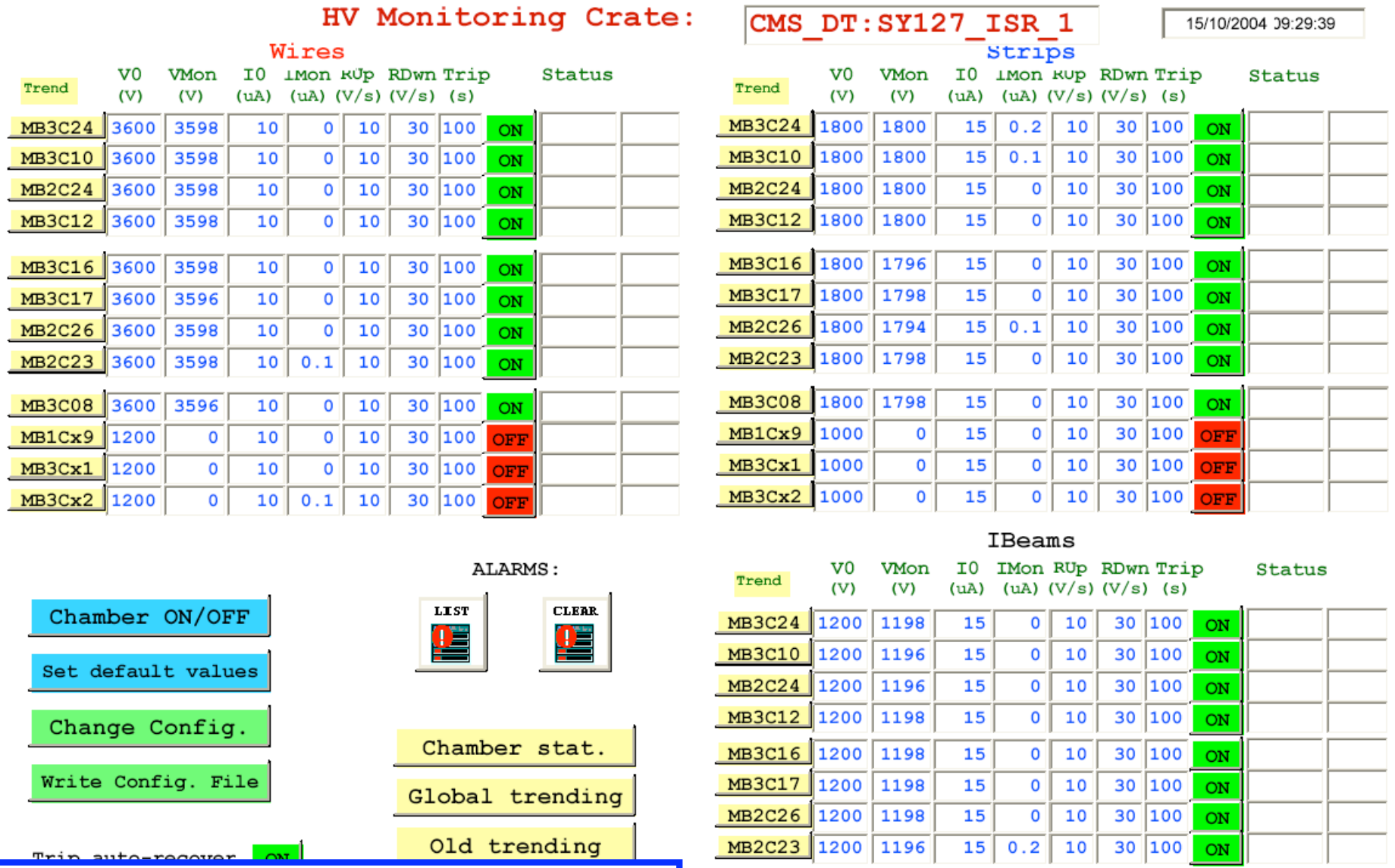
Pd:6MC/month

Bo:4MC/month

Then:

8+8 MC /month


Activity
2004
2005
2006
Sep.
Oct.
Nov.
Dec.
Jan.
Feb.
Mar.
Apr.
May
Jun.
Jul.
Aug.
Sep.
Oct.
Nov.
Dec.
Jan.
Feb.
Mar.
Apr.
May
Jun.
YB+2
Install MB1,HO Supports
Install HV,LV jumperBox
Install Radial Cable Trays
Install 12 BMU (3MC)
Install 9 BMU (5-7 MC)
1MB1,1MB2,8MB4 Missing
Complete BMU Installation
Install MC (Big Scissor Lift)
Commissioning (1DT)
Magnet swivelling
Magnet Test
YB+1
Install MB1,HO Supports
Install HV,LV jumperBox
Install Radial Cable Trays
Install 29BMU(-S4, 8MB4)
Complete BMU Installation
Commissioning (1DT)
YB0+ (Sectors:2,3,6,10,11)
Install HV,LV jumperBox
Install Radial Cable Trays
Install 17 + 3 BMU
Commissioning (1DT)
Complete BMU Installation
YB-1
Install MB1,HO Supports
Install HV,LV jumperBox
Install Radial Cable Trays
Install 8,9 BMU S10,S11
Commissioning (1DT)
Complete BMU Installation
YB-2
Install MB1,HO Supports
Install HV,LV jumperBox
Install Radial Cable Trays
Install 8,9 BMU S10,S11
Commissioning (1DT)
Complete BMU Installation
= HVB driven Installation



Chambers with ~90%Ar for 3 weeks
Under HV from October 05 to Nov 11
Now with CO_2 (600V wires ~1 week)

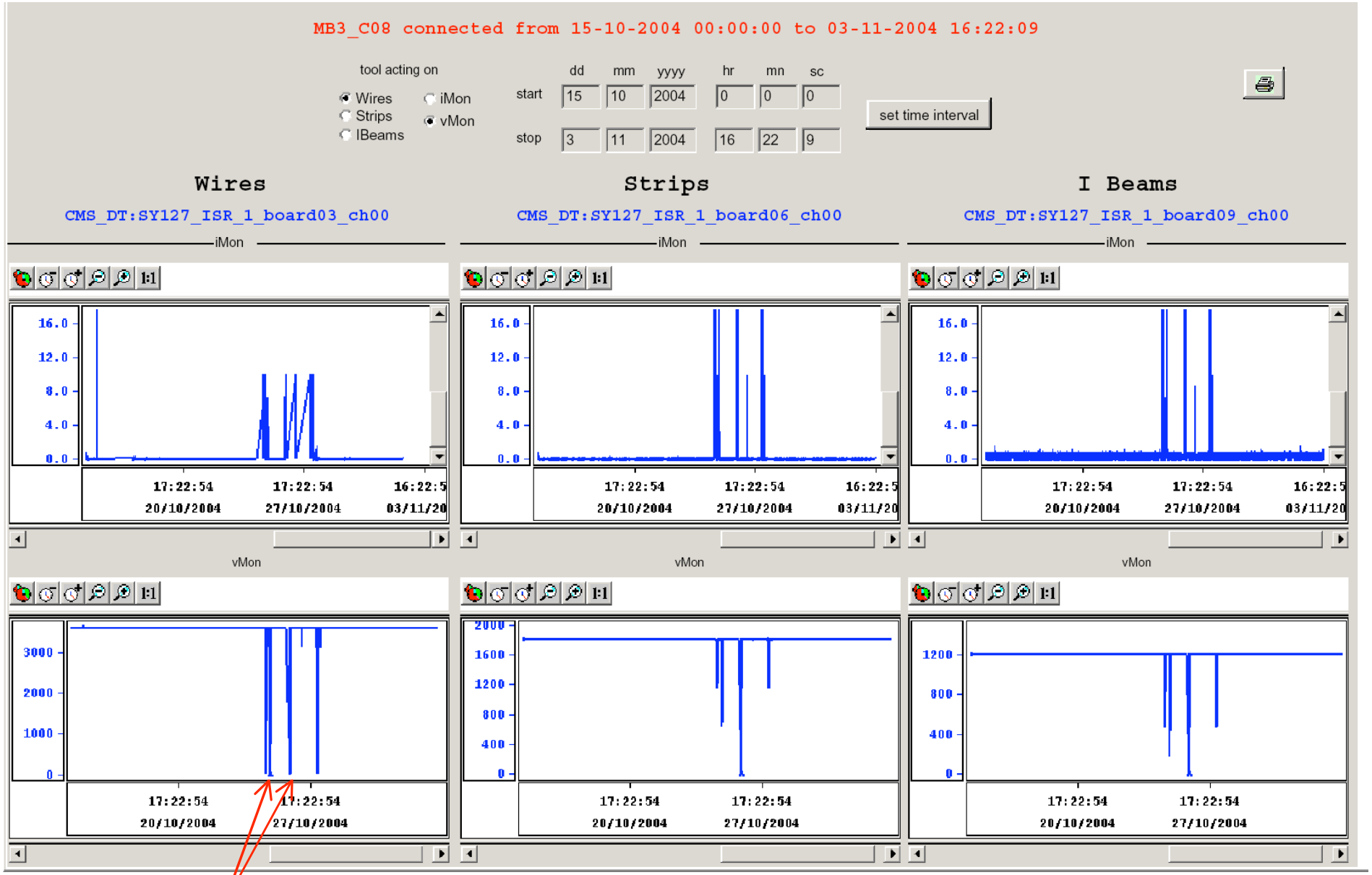
DT Commissioning (HV)

Chamber	Period	Comment
MB2C17	05/10 - 15/10	Many wire to cathode and wire-strip-cathode discharges up to 08/10 then quiet
	15/10 – 03/11	Quiet
MB2C23	05/10 - 15/10	Quiet
	15/10 – 03/11	Many 10 microA wire to ground spikes starting 20/10 some wire to strip 4microA
MB2C24	05/10 - 15/10	Many 2microA and 2 10microA wire to ground + 1 wire-strip-cathode
	15/10 – 03/11	Many 2microA and 2 10microA wire to strip
MB2C26	05/10 - 15/10	Quiet
	15/10 – 03/11	Quiet, 2 one microA wire to ground one 6 microA cathode to ground spike

Usual zoology of spikes and discharges…..

Chamber	Period	Comment
MB3C08	05/10 - 15/10	One wire-strip-cathode spike
	15/10 – 03/11	Several wire-strip trips (strip induced) from 25/10 to 28/10 then quiet
MB3C10	05/10 - 15/10	Many 2microA wire to ground spikes
	15/10 – 03/11	Frequent 2microA wire to ground spikes and some 10microA wire-cathode-strip starting 23/10
MB3C12	05/10 - 15/10	Several 2-4 microA wire to ground spikes
	15/10 – 03/11	Many 2-4 microA wire to ground spikes
MB3C16	05/10 - 15/10	Several 2microA wire to ground and 10microA wire to cathode spikes
	15/10 – 03/11	Several 10microA wire to ground and few 2microA wire to cathode spikes
MB3C24	05/10 - 15/10	Quiet
	15/10 – 03/11	Two 4-6 microA spikes wire to ground

We made plans for removing MB3C08 and repair it but then it cured itself. Phi SL could be repaired in place with an extractor to move the chamber by few centimeters


MB3_C08 connected from 15-10-2004 00:00:00 to 03-11-2004 16:22:09
tool acting on
Wires
Strips
IBeams
iMon
vMon
dd mm yyyy hr mn sc
start 15 10 2004 0 0 0
stop 3 11 2004 16 22 9
set time interval
Wires
CMS_DT:SY127_ISR_1_board03_ch00
Strips
CMS_DT:SY127_ISR_1_board06_ch00
I Beams
CMS_DT:SY127_ISR_1_board09_ch00
iMon
vMon
16.0
12.0
8.0
4.0
0.0
3000
2000
1000
0
1600
1200
800
400
17:22:54
20/10/2004
27/10/2004
03/11/20

Power Cut


MB2_C23 connected from 15-10-2004 00:00:00 to 03-11-2004 12:16:26
tool acting on
Wires
Strips
IBeams
iMon
vMon
dd mm yyyy hr mn sc
start 15 10 2004 0 0 0
stop 3 11 2004 12 16 26
set time interval
Wires
CMS_DT:SY127_ISR_1_board02_ch00
Strips
CMS_DT:SY127_ISR_1_board05_ch00
I Beams
CMS_DT:SY127_ISR_1_board08_ch00
iMon
vMon
13:55:00
20/10/2004
13:55:00
27/10/2004
Power Cut

DT Commissioning (Plans)

Status:

- 11 Chambers (July Installation) with CO_2, 9 cabled to HV
- 10 Chambers (October Installation) with Ar CO_2, HV junction boxes supports missing
- 12 Chambers (November Installation) not under gas flow
- 9 Chambers with MC, 24 MC to be installed

Before starting the commissioning, I would like to clean up the loose ends:

- LV Splitter Board ground straps (require cleaning iron and drilling+ tapping a hole)
- HV Jbx, LV (MC,PADC) connectors, supports, Flexrails,…

DT Commissioning (Plans)

In the meantime we should start the commissioning at the ISR:

- Insert MC on MB2C19 (to be installed in YB2+ S05)
- Standard tests
- Data acquisition with cosmics and self trigger:
  - Debug test system
  - Setup analysis/monitoring programs
  - Prepare instructions

Aim to start MC installation and commissioning by January 24th

Summary

At the CMS week in December 03 I reported some bad surprises, including a couple of HVB failures.

Today we can look at 33 installed chambers but the installation schedule is still driven by the HVB.

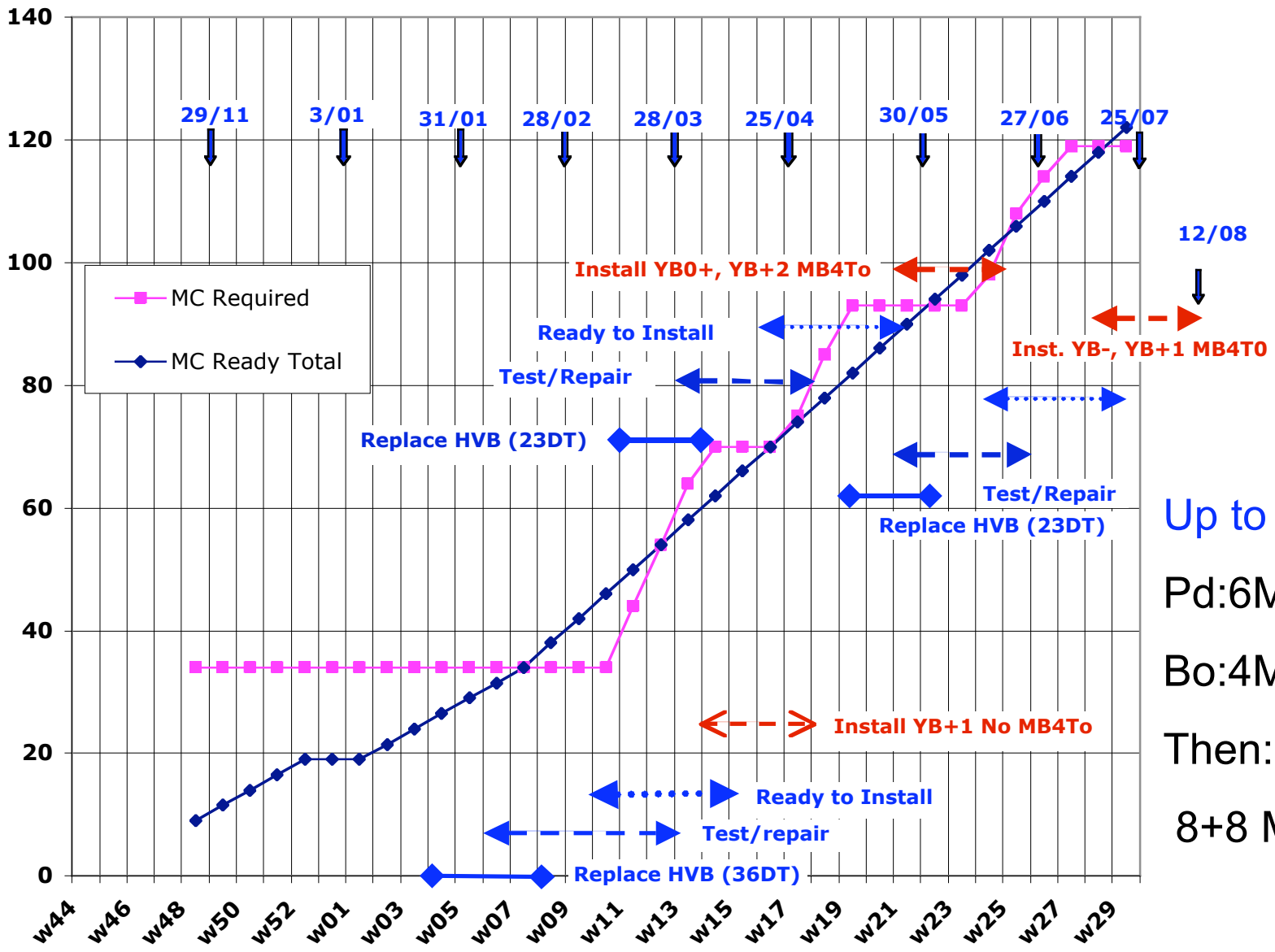
We have 9 chambers installed with MiniCrates but MC production is the next bottleneck (until now in the HVB shadow).

We are going to be very busy in 2005 and more so in 2006

I am looking forward to some MB4s from Torino, starting the commissioning and the Cosmic Challenge (Flash Gordon)

In the meantime please send all available chambers to the ISR by next February so that they can go through alignment calibration and dressing.

MC production vs Installation Schedule



Up to 21/02/05

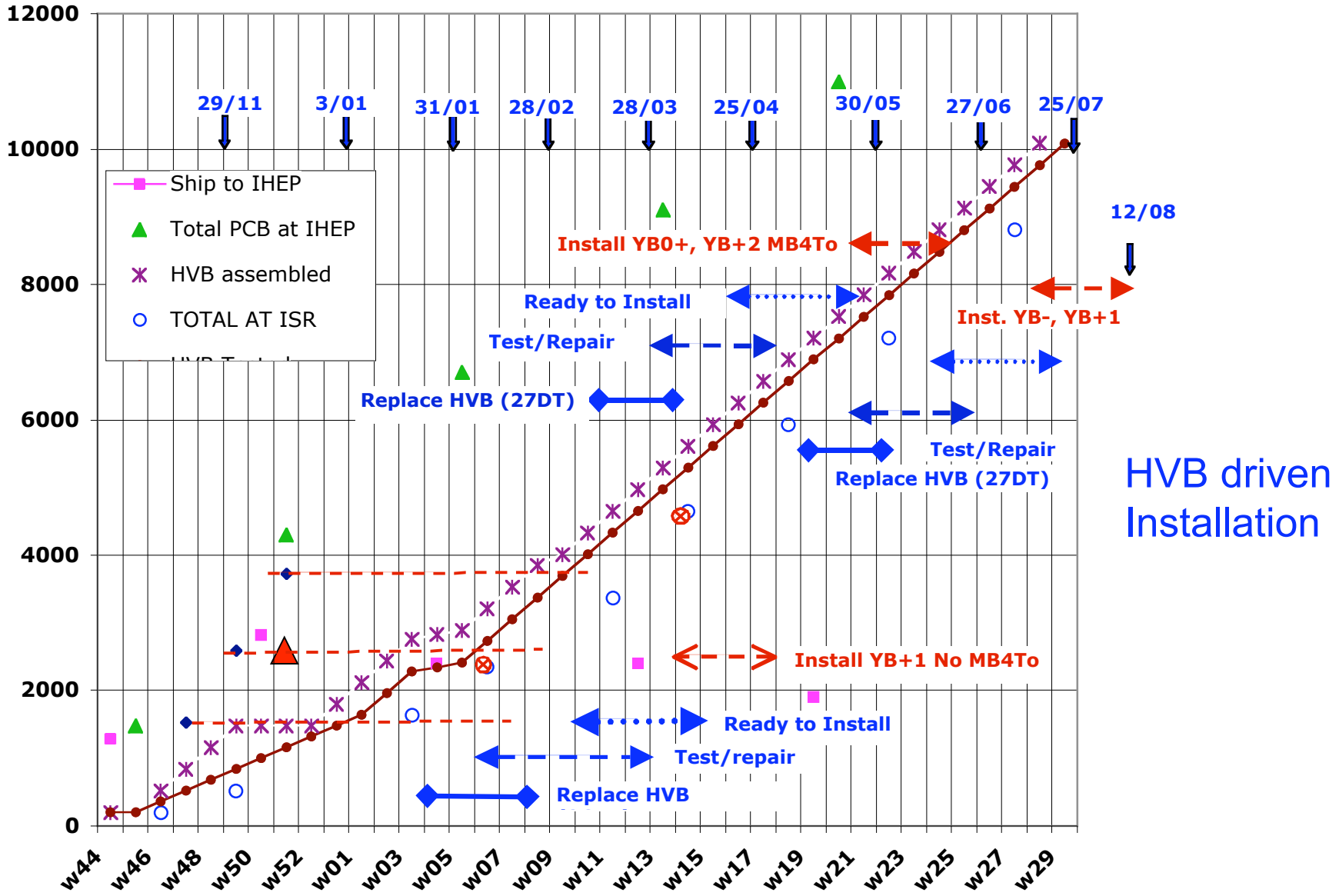
Pd:6MC/month

Bo:4MC/month

Then:

8+8 MC /month

MC late or just in time => No margin



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